

TYPIFICATION OF *SPONGOMORPHA* (KÜTZING) WILLE AND *ACROSIPHONIA* (J.G. AGARDH) WILLE (ACROSIPHONIALES, CHLOROPHYTA)

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ABSTRACT - Herbarium and literature investigations were carried out in order to typify *Spongomorpha* Kützing, 1843 and *Acrosiphonia* J.G. Agardh, 1846. *Spongomorpha congregata* (C. Agardh) Kützing designated as type for *Spongomorpha* in *Index Nominum Genericorum (Plantarum)* in 1979 is accepted. The lectotype of *Spongomorpha congregata* (C. Agardh) Kützing appears to be *Conferva uncialis* Lyngbye, 1819, preserved in C.A. Agardh's herbarium in Lund as no. 7089. *Acrosiphonia* J.G. Agardh has not been typified and *Acrosiphonia arcta* (L.W. Dillwyn, 1809) J.G. Agardh, 1846 has been chosen as type of the genus. The type specimen is a holotype labelled *Conferva arcta* 1 No. 108 (Leg. Miss Hutchins), kept in a bound volume entitled "Herb. Brit. Confervae", formerly belonging to Dillwyn, but now preserved in the National Museum of Wales, Cardiff (GB); the type locality is Bantry Bay, Ireland.

RÉSUMÉ - Le protologue des genres *Spongomorpha* Kützing, 1843 et *Acrosiphonia* J.G. Agardh, 1846 a fait l'objet d'études en vue de typifier ces genres. *Spongomorpha congregata* (C. Agardh) Kützing, proposé comme type de *Spongomorpha* dans l'*Index Nominum Genericorum (Plantarum)* en 1979, est maintenu. *Conferva uncialis* Lyngbye, 1819, conservé dans l'herbier d'Agardh à Lund sous le No. 7089, a été choisi comme lectotype de *Spongomorpha congregata*. En l'absence de type pour *Acrosiphonia* J.G. Agardh, 1846, *Acrosiphonia arcta* (Dillwyn, 1809) J.G. Agardh, 1846 est désigné comme le type du genre. Le spécimen type est un holotype qui se trouve sous le nom de *Conferva arcta* 1 No. 108 (Leg. Miss Hutchins) dans l'exsiccata de Dillwyn intitulé "Herb. Brit. Confervae", actuellement conservé au National Museum of Wales, Cardiff, Grande Bretagne; la localité type est la Baie de Bantry, Irlande.

KEY WORDS : typification, *Spongomorpha*, *Acrosiphonia*, Acrosiphoniales, Chlorophyta.

The Acrosiphoniales as circumscribed here encompasses marine green algae composed of uniseriate branched or unbranched filaments. The unbranched forms are assigned to two genera on the basis of the number of nuclei per cell: *Chlorothrix* Berger-Perrot (1982) with one nucleus per cell

and *Urospora* Areschoug (1866) with many nuclei per cell. Similarly, the branched forms may be divided into two genera: one *Spongomorpha* Kützing (1843) characterized by uninucleate cells and *Acrosiphonia* J.G. Agardh (1846) with multinucleate cells. This taxonomic treatment, initially described by Wille (1899, 1900, 1909), has been adopted by many subsequent workers (cf. Jónsson, 1962; Kornmann, 1962). Some authors, who do not accept the taxonomic value of number of nuclei per cell, merge these two genera on the basis of common morphological features under the name *Spongomorpha* Kützing (cf. South & Tittley, 1986). The taxonomic history of *Spongomorpha* / *Acrosiphonia* has been reviewed by Kjellman (1893), Setchell & Gardner (1920) and Jónsson (1962).

The aim of the present paper is to clarify the typification of *Spongomorpha* and *Acrosiphonia*.

SPONGOMORPHA KÜTZING (1843)

Herbarium specimens examined

Botaniska Museet, Lund (LD), Agardh's herbarium:

- sheet No 89:02-0005; specimens No 7089, 7090, 7091, 7092, 7093, 7094, 7095
- sheet No 89:02-0006; specimens No 7106, 7109, 7113, 7114, 7122, 7124

Botanisk Museum, Copenhagen (C), Lyngbye's herbarium:

- sheet No 2/89/2-2 (*Conferva lanosa* No 46)
- sheet No 2/89/2-3 (*Conferva uncialis* No 47)

Rijksherbarium, Leiden (L), Kützing's herbarium:

- sheet No L 8559-1 (*Conferva uncialis* Lyngb., *Spongomorpha congregata* Kg.)
- sheet No L 8559-2 (*Spongomorpha congregata*)
- sheet No L 8559-3 (*Spongomorpha congregata* Kg. / *Conf. uncialis* Lyngb.)
- sheet No L 8559-4 (*Spongomorpha uncialis* Kg.)
- sheet No L 8559-5 (*Spongomorpha uncialis*)

Private herbarium of S. Jónsson:

Spongomorpha aeruginosa (Linnaeus) van den Hoek.

Discussion

When creating the genus *Spongomorpha* in 1843 (*Phycologia generalis*, p. 273), Kützing referred only two species to this genus: *Spongomorpha uncialis* (C.A. Agardh) Kützing, from the Baltic (synonymous with *Conferva uncialis* C.A. Agardh as described in *Systema Algarum*, 1824, p. 111) and *Spongomorpha congregata* (C.A. Agardh) Kützing from Helgoland (synonymous with *Conferva congregata* C.A. Agardh, described in the same work). C.A. Agardh (*loc. cit.*) regarded his *Conferva uncialis* as synonymous with *Conferva uncialis* O.F. Müller as illustrated in *Flora danica* (1778, tab. 771, fig. 1) but not with *Conferva uncialis* Lyngbye as described and pictured in Lyngbye's *Tentamen Hydrophytologiae Danicae*, (1819, p. 160, No 47, tab. 56 B; cf. also Lyngbye's herbarium No 47). Conversely, C.A. Agardh considered his *Conferva congregata* synonymous with *Conferva uncialis* Lyngbye.

Conf. uncialis 1023
 Lyngb. Tent. Høst: Tab. 56.
 omnes eadem cum specimen Lyngb. originalis
 veli quod color pallidior, qui in illo observatur
 et in marginibus specimenis.

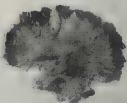


Fig. 1 - *Conferva uncialis* Lyngbye; type specimen in Agardh's Herbarium in Lund, with C.A. Agardh's annotations; nat. size: 2,5cm in height.

In the *Index Nominum Genericorum (Plantarum)* (= ING (P), vol. III, p. 1656, 1979) *Spongomorpha congregata* (C. Agardh) Kützing is designated as the type for *Spongomorpha* Kützing (1843). It is not known why this species was adopted in preference to *Spongomorpha uncialis* (C. Agardh) Kützing, however, this must be accepted (cf. ICBN, Art. 7.2). Kützing's diagnosis of *Spongomorpha* is rather meagre, merely indicating the compact habit of the filamentous branched thallus - "*trichomata ramosa in phycoma ramosum complicata*", and no descriptions of the two included species are provided (*Phycologia generalis*, 1843, p. 273-274). Kützing only refers to C.A. Agardh's description in *Systema Algarum* (1824) which is as follows for *Conferva congregata*: "*Conferva congregata, caespitibus fasciculatis clavatis, semiglobum constituentibus, filis intricatis ramosis, ramis adscendentibus, articulis diametro subaequalibus*"; this translates as "*C. congregata* composed of fasciculated club-like tufts forming hemispheric balls, with entangled branched filaments, branches upright with subsodiametric articles." C.A. Agardh adds

that the species grows "ad rupes in mari septentrionali & sinu Codano", i.e. on rocks in the Norwegian Sea and in the Kattegat. As to *Conferva uncialis* Lyngbye, the synonym of *Conferva congregata* according to C.A. Agardh, its diagnosis does not substantially differ from that of *Conferva congregata*. Indeed, Lyngbye, in his *Tent. Hydrophytol. Danicae* (1819, p. 160) writes: "*C. uncialis*, filis e centro communi egressis, ramosissimis, fasciculatis; fasciculis antice clavatis, rotundatis, semiglobum constituentibus; ramis remotis, divaricatis, ultimis brevibus subsecundis; articulis diametro subduplo longioribus", i.e. "*C. uncialis* with filaments issued from a common centre, much branched, forming fascicles; terminal fascicles clavate, rounded, forming hemispheric thallus; branches spread, divaricate, short towards the top, more or less second, articles nearly twice as long as broad". In addition, Lyngbye notes: "*habitat ad scopulos insularum exteriorum Norvegiae, iisdemque in ipsa aqua marinae superficie affixa, ad littus inter Öster-Rüisöer et Arendal, sad vulgaris*", i.e. "grows attached to skerries of the outer isles of the Norwegian coast, at the very surface of the sea, on the shore between East-Risör and Arendal (southern Norway), rather common".

The specimens on which Lyngbye based his description of *Conferva uncialis* are preserved in his herbarium (C), sheet No 47 (species number in *Tent. Hydrophytol. Danicae*, 1819). These specimens were collected by Lyngbye himself at the entrance of Oksfjord and along the isles of East-Sternisöer, Finnmark, N-Norway. On the same sheet, in a packet containing six specimens labelled "*Cum Delineatione*", i.e. with drawing (this annotation means that this material was used to illustrate *Conferva uncialis*, tab. 56 B, in *Tent. Hydrophytol. Dan.*), in addition to the locality of Oksfjord, Lyngbye indicates the exact date of collection of this material, viz. the 26th of June 1816. On the same packet Lyngbye originally wrote two names: *Conferva uncialis* and *Conferva alta ocellata*. The latter was then crossed off and replaced by (*Conferva*) *congregata* Ag. The handwriting of this new epithet is not Lyngbye's, but might be C.A. Agardh's. The possibility that C.A. Agardh examined these specimens cannot be excluded; however, he would have to have done this after the publication of his *Systema Algarum* in 1824 as the epithet *congregata* appears for the first time in this work. These specimens are therefore doubtful candidates as lectotypes.

There is little doubt that the sheet No 89/02-0005 in Agardh's herbarium (LD) was entirely mounted by C.A. Agardh himself (*vide* Per Lassen, LD) rather than by his son, J.G. Agardh, who apparently often introduced confusion into his father's collection. The packet No 7089 on this sheet (Fig. 1), containing one specimen entitled "*Conf. uncialis* Lyngb. Tent: Hydr: Tab: 56.", in unknown hand, bears the following comments written by C.A. Agardh: "*omnino convenit cum specimine Lyngbyei originali nisi quod color pallidior, qui in illo olivaceus ut in margine nostri speciminis*", i.e. "agrees precisely with Lyngbye's specimen except for a paler colour, which is olivegreen at the margin of our specimen". As Agardh does not mention *Conferva congregata*, published in his *Systema Algarum* in 1824, whereas a reference is made to *Conferva uncialis* Lyngbye in *Tent. Hydroph. Danicae*, published in 1819, it is obvious that C.A. Agardh's comments were written after 1819 and prior to 1824. This suggests that C.A. Agardh had this specimen at hand

when he described his *Conferva congregata*. The specimen LD-7089, designated as *Conferva uncialis* Lyngbye 1819 = *Conferva congregata* C.A. Agardh 1824 is therefore the best choice of lectotype for *Spongomorpha congregata* (C. Ag.) Kützing, which is the type of the genus *Spongomorpha* Kützing 1843. This specimen has a fan-like habit, measuring 2.5cm in height, and is composed of branched uniseriate filaments, 12-20(-24) μ m broad. Each vegetative cell contains a single, sometimes largely perforate chloroplast with many pyrenoids. When stained with acridine-orange and observed in the fluorescence microscope, one nucleus is visible as a bright green spot in many cells. These characters are those of the present-day *Spongomorpha aeruginosa* (L.) van den Hoek, the only species referred to *Spongomorpha* (Kützing) Wille.

The lectotype specimen and the *Conferva uncialis* specimens marked "Cum Delineatione" (cf. above) in Lyngbye's collection (C) are morphologically and cytologically similar, including one nucleus per cell. This suggests that the lectotype specimen might have been collected, similar to Lyngbye's material, in Oksfjord, Finnmark, N-Norway.

Other specimens mounted on the same sheet as the lectotype may be regarded as syntypes. Two of them (LD-7091, LD-7093) come from the North Sea (Lyst, Helgoland), one (LD-7095; 2 ex.) under the name of *C. lanosa* Dillw. "misit Borrer" (= W. Borrer 1781-1862) is from the British Isles, collected on the coast of Murray by J. Brodie, whereas other specimens on this sheet are from unknown localities. The sheet is labelled as "*Conferva congregata* / *Conferva uncialis* Lyngbye" in C.A. Agardh's hand in ink. Although differing in habit, all these specimens are similar in cell structure with uninucleate cells. Some other specimens found in Agardh's herbarium (LD-7106, LD-7109, LD-7113, LD-7122, LD-7124) annotated by C.A. Agardh as "*Conferva uncialis* Lb., *Conferva congregata* Ag. or *Conferva lanosa*" may also be regarded as syntypes. On the other hand, there is no evidence that Agardh examined Lyngbye's collection of *Conferva lanosa* (C, sheet No 46). These algae are all similar in structure to the lectotype. In one case this is confirmed by drawings on the reverse of a specimen collected the 18th of August 1812 at Hindsholm, a peninsula on the northeast coast of the isle of Funen, Denmark. As to Kützing's specimens (L), it is unlikely that Agardh examined them, and they can therefore not be considered as syntypes. Some of these come from the French coast (Luc, Cherbourg), S-Sweden (Bohuslän) or the Baltic. All Kützing's specimens correspond to the present day *Spongomorpha aeruginosa* (L.) Van den Hoek. They have uninucleate cells (Kützing's microscopic preparations not studied for nuclei).

The present discussion can be summarized as follows:

SPONGOMORPHA KÜTZING

Kützing, *Phycologia generalis*, 1843, p. 273.

Wille, *Bot. Not.* 30 nov. 1899, fasc. 6, p. 281 (= *Spongomorpha* (Kützing) Wille).

Synonyms:

Conferva Linnaeus, *Species Plantarum*, II, 1763, Hafniae, p. 1634, *pro parte*.

Cladophora Kützing, *Phycologia generalis*, 1843, p. 263, *pro parte*.

Cladophora (*Spongomorpha*) Kützing, *Species Algarum*, 1849, p. 417, *pro parte*.

Acrosiphonia (J.G. Agardh) Kjellman, 1893, subgenus *Isochrous*, p. 82.

Type:

Spongomorpha congregata (C. Agardh) Kützing, *Phycologia generalis*, 1843, p. 273 (cf. ING (P), 1979, vol. III, p. 1656); type specimen (lectotype): specimen No 7089 in Agardh's herbarium (LD) as *Conferva uncialis* Lyngbye (cf. *Tent. Hydrophytol. Danicae*, tab. 56); probable type locality: Oksfjord, Finnmark, N-Norway. Many syntypes.

ACROSIPHONIA J.G. AGARDH (1846)**Herbarium specimens examined**

Botaniska Museet, Lund (LD), Agardh's herbarium:
 - sheet No 89:06-0069: specimens No 7162, 7163, 7164, 7165, 7166, 7167, 7168, 7169, filed as *Conferva centralis* Lb.
 - sheet No 89:06-0070: specimens No 7183, 7184, 7185 (2 ex.), 7186, filed as *Conferva centralis* Lb.

Botanisk Museum, Copenhagen (C), Lyngbye's Herbarium (No 48):
 - sheet No 2,89;1-2 (*Conferva centralis*, 4 specimens)

Rijksherbarium, Leiden (L), Kützing's Herbarium:
 - sheet No L 8667/ 1 (*Cladophora Sonderi*, 2 ex.).

British Museum (Natural History), London (BM):
 - sheet No 00123 ex herb. Harvey (*Conferva centralis*)

National Museum of Wales, Cardiff (NMW):
 - L.W. Dillwyn's "Herb. Brit. Confervae" (fragments of specimens labelled *Conferva arcta* 1 No 108 and *Conferva arcta* 2 No 108).

Private herbarium of S. Jónsson:
Acrosiphonia material from France and Iceland.

Discussion

The genus *Acrosiphonia* was described by J.G. Agardh in 1846, presumably as a reaction to Kützing's chaotic treatment of this taxon in *Phycologia generalis* in 1843 and especially in *Phycologia germanica* in 1845 where these algae are assigned either to *Cladophora* or to brown algae (*Ectocarpaceae*). Agardh points out that polymorphism in the group has led to the creation of too many species. As examples he gives *Conferva lanosa* (= *Conferva congregata*), *Conferva arcta* (= *Conferva centralis*) and *Conferva membranacea* (= *Vaucheria brasiliensis* Mart.). J.G. Agardh does not mention *Conferva uncialis* Lyngbye 1819, the lectotype of *Spongomorpha congregata* (C. Ag.) Kützing which is the type genus *Spongomorpha* (cf. above). The name *Acrosiphonia* is therefore in agreement with past and present recommendations of ICBN (Art. 63, 1, note 2, 1988), and is thus a valid name.

No type has been designated previously for *Acrosiphonia* J.G. Agardh and *Acrosiphonia arcta* (Dillwyn) J.G. Agardh is herein proposed as the type for this genus. The basionym of this species is *Conferva arcta* described by L.W. Dillwyn in his "British Confervae" (London, 1809, p. 67, number 108) and illustrated by the tab. E Suppl. Dillwyn's diagnosis of this species is



Fig. 2. - *Conferva arcta* Dillwyn; type specimen in Dillwyn's "Herb. Brit. Confervae", National Museum of Wales, Cardiff; nat. size: 8,7cm in height (courtesy of Mr. Alan Orange, NMW).

rather short: "108, *arcta*. *C. filis ramosis, strictis, virgatis, caeruleo-viridibus; ramis subpatentibus, ultimis sparsis adpressis; articulis inferioribus, brevibus, superioribus, longissimis. T.E. In the Sea, Bantry Bay, Miss Hutchins*", i.e. "108, *arcta*. *C.* forming branched, straight, rod-like, bluish-green filaments; branches somewhat spreading, sparse towards the top, appressed; lower articles short, the upper ones very long..." In the diagnosis no mention is made of the hooked spiny branches characteristic of this species. However, in the accompanying description Dillwyn draws attention to such branches as he states: "they (the branches)... are curled inwards in a remarkable manner". In addition, the illustrations of *Conferva arcta* by W.T. Hooker (1785-1865) show a branch, c. 2,3cm long, apparently removed from the middle region of a thallus, and provided with acute tips. It is also evident from the draw-

ings that terminal branches have long cells with obtuse tips, while basally located cells are nearly isodiametric. These characters are those of *Acrosiphonia arcta* (Dillwyn) J. Agardh.

The description of *Conferva arcta* is based on several specimens. These were furnished by Dawson Turner (1775-1858), who in turn received them from Miss Hutchins (died in 1814) who collected this material in Bantry Bay, Ireland. There is little doubt that some of these specimens are those found in the bound volume named "Herb. Brit. Confervae" which belonged to L.W. Dillwyn himself, and is, since 1938, preserved in the Department of Botany, National Museum of Wales (NMW). This volume contains 277 specimens of algae, including two sheets with *Conferva arcta* labelled "C. arcta 1 No 108" (2 ex.) and "C. arcta 2 No 108", written by hand, without collection details or annotations (*vide* Alan Orange, NMW). However, although there are many specimens in this volume which are original material used by Dillwyn in the preparation of "British Confervae", others seem to be additional specimens (Dixon, 1966) and some specimens are lacking (*vide* Alan Orange, NMW).

Regarding the *Conferva arcta* specimens, they most probably represent Dillwyn's original material. They all belong to the present-day *Acrosiphonia arcta* (Dillwyn) J. Agardh. The two specimens labelled "*Conferva arcta* 1 No 108" are about 8cm in height, forming hemispherical tufts, whereas "*Conferva arcta* 2 No 108" is about 16cm in height (according to photographs). The latter consists of many distinct, robe-like fascicles terminating in tufts of irregularly spreading branches. This plant appears older than the two others. It compares well with the specimen described by Dillwyn as having "a flaccid *Ulva* like appearance" (*Brit. Confervae*, p. 67). Although differing in habit, *Conferva arcta* 1 and 2 are similarly organized, viz. composed of branched, uniseriate filaments consisting of long cells (only the lower specimen on the sheet of *C. arcta* 1 No 108 seen) in the upper part, and much shorter cells below. The filaments in upper parts are more or less straight with rounded tips, whereas in the lower part they are either straight or incurved or clearly hooked with acute tips as mentioned and partially illustrated in Dillwyn's illustrations. A perforate chloroplast may be observed in some well preserved cells, each with many pyrenoids surrounded by numerous starch grains (polypyramidal pyrenoids), the latter very conspicuous after IKI treatment. Multinucleate cells can be resolved by staining with acridine orange. Some filaments bear zooidangia (gametangia?), either solitary or many in rows. A semicircular exit pore may be found in some empty zooidangia. Filament diameter is generally 55 (-60) -70 μ m in *Conferva arcta* 1, whereas it is somewhat larger in *Conferva arcta* 2, varying from 55(-60)-90 μ m.

These specimens, especially *Conferva arcta* 2 No 108, fit well with Miss Hutchins specimens, collected in Bantry Bay in 1807, and now kept in Harvey's herbarium (BM) as *Conferva centralis*. This specimen, the only one found in BM, collected in Bantry Bay by Miss Hutchins, has hooked spiny branches, and agrees perfectly with present-day *Acrosiphonia arcta* (Dillwyn) J. Agardh. Other specimens from Miss Hutchins collections formerly kept in the Royal Botanic Garden at Kew, but now apparently mislaid, were exam-

ined by Kornmann (1962). This material, including a specimen from Bantry Bay, was identified by Kornmann as *Acrosiphonia arcta* (Dillwyn) J. Agardh. Drawings given by Kornmann (loc. cit., fig. 10) show branching and diameter of filaments similar to those of Dillwyn's *C. arcta*. In addition, the specimen No 7183 in Agardh's herbarium (LD) is identical to *C. arcta* 2 No 108. This specimen marked "*arcta* var." (in unknown hand) is annotated by J.G. Agardh as "sp. orig. mis. Dillwyn". Another specimen distributed in Agardh's herbarium No 7184, designated "*arcta*" (same unknown handwriting) is annotated "sp. orig. Dillwyn" by J.G. Agardh. The latter is a young, apparently unfertile plant, but does not otherwise differ from Dillwyn's *Conferva arcta*, especially *C. arcta* 1 No 108.

The similarity of all this material indicates that Dillwyn's *C. arcta* 1 and 2 are original specimens, and that they have therefore been used for the description of *Conferva arcta* in "*British Confervae*". For this reason I propose that "*Conferva arcta* 1 No 108" be designated as the holotype for *Acrosiphonia arcta* (Dillwyn) J. Agardh, which in turn has been chosen as the type of the genus *Acrosiphonia* J.G. Agardh 1846 (Fig. 2). "*Conferva arcta* 2 No 108" and the specimens "*arcta* var." (LD 7183) and "*arcta*" (LD 7184) are isotypes. The specimens of Miss Hutchins may be considered as syntypes because there is no proof that Dillwyn saw them. Other specimens examined during this study are referable to different species of the genus *Acrosiphonia*, but cannot be regarded as syntypes.

Some of these specimens belong to *Acrosiphonia arcta* (Dillwyn) J. Agardh: LD 7185 as *Conf. centralis* (2 ex.), the larger specimen collected at Torquay (GB), by Mrs G = Mrs Griffiths, "misit Harvey", in C.A. Agardh's hand; LD 7162 as *Conferva centralis*? from Lyst; LD 7165 as *Conferva congregata* Ag. from (illegible) collected by Suhr; LD 7168, anonymous specimen on broken mica "ex ins. Faeroe, mis. Suhr d Fr."; Herb. Lyngbye (C, sheet 48) as *Conferva uncialis* | *Conferva centralis*? from (illegible). Other specimens may be assigned to *Acrosiphonia centralis* (Lyngbye) Kjellman, 1893: LD 7185, the smaller specimen; LD 7186 as *Conferva centralis* from Torquay "mis Harvey"; LD 7163 as "*Conf. centralis* Lyngbye ad Hofmansgave 1824", in C.A. Agardh's hand; LD 7164, anonymous and unlocated spongy specimen; LD 7166 as *Conf. centralis* Lyngb. "af Hofm. originalspeimen", in C.A. Agardh's hand; LD 7167 as "*Conferva centralis* Lyngb., Hofmansgave", written by C.A. Agardh; LD 7168, three specimens on unbroken mica slides (cf. above); LD 7169 as "*Conferva congregata* Ag.! fide Suhr, Faroi 1830, Frölich"; Herb. Lyngbye (C), specimen as "*Conf. hutchinsiae* 1 st. avril 1816 ad Hals" (isle of Funen), two specimens, one on newspaper, the other with drawings and text on the backside, this latter collected the 24th of April 1813 in Odensefjord, Funen. The two specimens in Kützing's herbarium, L 8667-2, collected at Helgoland by Sonder as *Cladophora Sonderi*, with description and measurements, written by Sonder in pencil, represent the present-day *Acrosiphonia sonderi* (Kützing) Kornmann 1962.

Among these specimens *Conferva centralis* in Lyngbye's herbarium (C, sheet 48) with illustrations and comments on the reverse of the label, is here designated as holotype of *Acrosiphonia centralis* (Lyngbye 1819) Kjellman 1893 (basonym; *Conferva centralis* Lyngbye, *Tent. Hydrophytol. Danicae*, 1819, p. 161, No 48, tab. 56 C). Similarly, the holotype of *Acrosiphonia sonderi* (Kützing) Kornmann 1962 is the specimen in Kützing herbarium (L) designated as *Cl. Spongomorpha Sonderi* from Helgoland, annotated by Sonder (basonym: *Cladophora Sonderi* Kützing, *Phycologia germanica*, 1845, p. 208, No 11; *Tab. Phycol.*, 1854, IV, 79).

From this discussion the typification of the genus *Acrosiphonia* J.G. Agardh can be summarized as follows:

ACROSIPHONIA J.G. AGARDH

Agardh, J.G., 1846, *Anadema* ett nytt slägte bland Algerne, K. svenska Vet.-Akad. Handl., p. 12; Wille, N., 1899, Bot. Not., 30 nov., fasc. 6, p. 281 (= *Acrosiphonia* (J.G. Agardh) Wille).

Synonyms:

Cladophora Kützing, *Phycologia generalis*, 1843, p. 263, *pro parte*; *Phycologia germanica*, 1845, p. 207, *pro parte*.

Cladophora (*Comosae*) Kützing, *Species Algarum*, 1849, p. 389, *pro parte*.

Cladophora (*Spongomorpha*) Kützing, *Species Algarum*, 1849, p. 417, *pro parte*.

Cladophora (*Spongomorpha*) Kützing, *Species Algarum*, 1849, p. 417, *pro parte*.

Melanarthrum Kjellman 1893, p. 50 (subgenus of *Acrosiphonia* (J.G. Agardh) Kjellman).

Type:

Acrosiphonia arcta (Dillwyn) J. Agardh 1846, K. svenska Vet.-Akad. Handl., p. 12; basionym: *Conferva arcta* L.W. Dillwyn, *British Confervae*, London 1809, p. 67, No 108, Tab. E, Suppl.; type specimen (holotype): specimen in L.W. Dillwyn's "Herb. Brit. Confervae" labelled *C. arcta* 1 No 108, kept in the National Museum of Wales (NMW), Department of Botany; type locality: Bantry Bay, Ireland, Leg. Miss Hutchins; isotypes: NMW as *C. arcta* 2 No 108, LD 7183 as "*arcta* var." and LD 7184 as "*arcta*"; syntype: BM, specimen "ex herb. Harvey", collected by Miss Hutchins in 1807 in Bantry Bay, annotated as *Conferva centralis*.

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BIBLIOGRAPHY

- AGARDH C.A., 1824 - *Systema Algarum*, Lundae.
- AGARDH J.G., 1846 - *Anadema* ett nytt slägte bland Algerne. K. svenska Vet.-Akad. Handl., p. 1-16, tab. XVII.
- ARESCHOUG J.E., 1866 - *Observationes Phycologiae*. I. De Confervaeis nonnullis. *Nova Acta Regiae Soc. Sci. Upsal.*, ser. 3, 6 (2): 5-26.
- BERGER-PERROT Y. & THOMAS J.C., 1982 - Etude ultrastructurale comparée du pyrénéide et des parois dans les genres *Ulothrix*, *Chlorothrix* et *Urospora*. *Phycologia* 21: 355-369.

- DILLWYN L.W. - *British Confervae*, London, 1809.
- DIXON P.S., 1966 - Notes on important algal herbaria, IV. The herbarium of Lewis Weston Dillwyn (1778-1855). *Brit. Phycol. Bull.* 3 (1): 19-22.
- FARR E.R. et al (Eds.), 1979 - *Index Nominum Genericorum (Plantarum)*. Vol. I and III. Bohn, Scheltema & Holkema, Utrecht.
- GREUTER W. et al. (Eds), 1988 - *International Code of Botanical Nomenclature*. Koeltz Sci. Books, Germany.
- HOLMGREN P.K. & KEUKEN W., 1974 - *Index Herbarium I. The herbaria of the world*. Utrecht.
- JÓNSSON S., 1962 - Recherches sur des Cladophoracées marines (structure, reproduction, cycles comparés, conséquences systématiques) *Ann. Sci. Naturelles, Bot.*, 12° sér., T. III: 25-230 + XVIpl.
- KJELLMAN F.R., 1893 - Studier öfver Chlorophycéslägget *Acrosiphonia* och dess skandinaviska arter. *Bihang k. svenska Vet.-Akad. Handl.*, 18, III, 5: 1-144 + 8 tab.
- KORNMANN P., 1962 - Eine Revision der Gattung *Acrosiphonia*. *Helgol. wiss. Meeresunters.* 8: 219-242.
- KÜTZING F.T., 1843 - *Phycologia generalis*, Leipzig.
- KÜTZING F.T., 1845 - *Phycologia germanica*, Nordhausen.
- KÜTZING F.T., 1849 - *Species algarum*, Lipsiae.
- KÜTZING F.T., 1853-1854 - *Tabulae phycologicae*, vol. III, vol. IV, Nordhausen.
- LANJOUW J. & STAFLEU A., *Index Collectors*, Utrecht 1957 (= *Regnum Vegetabile*, vol. 9, Part II (2), 1957).
- LINNAEUS C., 1763 - *Species plantarum*, II. Hafniae.
- LYNGBYE H.C., 1819 - *Tentamen Hydrophytologiae Danicae*. Hafniae.
- MÜLLER O.F., 1778 - see OEDER C.G. et al., *Flora Danica*, 1778, fig. 771.
- OEDER C.G. et al. (Eds.), 1761-1883 - *Icones plantarum... Florae Danicae*. Hafniae.
- SETCHELL W.A. & GARDNER N.L., 1920 - The marine algae of the Pacific Coast of North America. Part II. Chlorophyceae. *Univ. Calif. Publ. Bot.*, 8 (2): 139-375 + pl. 9-33.
- SOUTH G. Robin & TITTLE L., 1986 - *A checklist and distributional index of the benthic marine algae of the North Atlantic Ocean*. Huntsman Marine Laboratory and British Museum (Natural History), St Andrews and London, 76 p.
- STEARNS W.T., 1983 - *Botanical Latin*, Eds.: David & Charles, 3rd rev. Ed. London.
- WILLE N., 1899 - Undersögelse angående Cellkjörnens Förhold hos Slægten *Acrosiphonia* (J. Ag.) Kjellm., *Bot. Not. Sverige*, fasc. 6.
- WILLE N., 1900 - Die Zellkerne bei *Acrosiphonia* (J. Ag.) Kjellman. *Bot. Centralbl.*, LXXXI, 7, XXI year: 238-239.
- WILLE N., 1909 - *Conjugatae und Chlorophyceae*. In: A. Engler & K. Prantl, Die natürlichen Pflanzenfam. (Nachträge zum I. Teil, 2. Abteilung über die Jahre 1890 bis 1910, Leipzig 1911).